

ABSTRACT OF THE INVENTION

APERTURE CODED CAMERA FOR THREE DIMENSIONAL IMAGING

A system and method for determining instantaneously the three-dimensional coordinates of large sets of points in space is disclosed. This system uses two or more CCD cameras (or any other type of camera), each with its own lens and pinhole. The CCD's are all arranged so that the pixel arrays are within the same plane. The CCD's are also arranged in a predefined pattern. The combination of the multiple images acquired from the CCD's onto one single image forms a pattern, which is dictated by the predefined arrangement of the CCD's. The size and centroid on the combined image are a direct measure of the depth location Z and in-plane position (X,Y), respectively. The use of a predefined pattern enables high speed computation through simple algorithmic procedures. Moreover, the use of CCD cameras allows for the recording of such datasets at the corresponding image frame rate, thus opening the use of the invention to the mapping of dynamical systems.